

# End-point assessment plan for Artificial Intelligence (AI) Data Specialist apprenticeship standard

Apprenticeship standard number	Apprenticeship standard level	Integrated end-point assessment
ST0763	7	No

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## Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the Artificial Intelligence (AI) Data Specialist apprenticeship standard. It is for end-point assessment organisations (EPAOs) who need to know how EPA for this apprenticeship must operate. It will also be of interest to Artificial Intelligence (AI) Data Specialist apprentices, their employers and training providers.

Full time apprentices will typically spend 24 months on-programme (before the gateway) working towards the occupational standard, with a minimum of 20% off-the-job training. All apprentices must spend a minimum of 12 months on-programme.

The EPA period should only start, and the EPA be arranged, once the employer is satisfied that the apprentice is deemed to be consistently working at or above the level set out in the occupational standard, all of the pre-requisite gateway requirements for EPA have been met and can be evidenced to an EPAO.

For level 3 apprenticeships and above apprentices without English and mathematics at level 2 must achieve level 2 prior to taking their EPA.

The EPA must be completed within an EPA period lasting typically 6 months after the EPA gateway.

The EPA consists of three discrete assessment methods.

The individual assessment methods will have the following grades:

### **Assessment method 1:** Project Report with presentation and supplementary questioning

- Fail
- Pass
- Distinction

### **Assessment method 2:** Professional Discussion

- Fail
- Pass
- Distinction

### **Assessment method 3:** Technical Test

- Fail
- Pass
- Distinction

### **Performance in all assessment methods of the EPA will determine the overall apprenticeship standard grade of:**

- Fail
- Pass
- Merit
- Distinction

## EPA summary table

<b>On-programme</b> (typically 24 months)	Training to develop the occupation standard's knowledge, skills and behaviours (KSBs).
<b>End-point assessment gateway</b>	<ul style="list-style-type: none"> <li>• Employer is satisfied the apprentice is consistently working at, or above, the level of the occupational standard</li> <li>• English and mathematics Level 2</li> </ul>
<b>End-point assessment</b> (which will typically take 6 months)	<p>Assessment method 1: Project Report with presentation and supplementary questioning</p> <p>With the following grades:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul> <p>Assessment method 2: Professional Discussion</p> <p>With the following grades:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul> <p>Assessment method 3: Technical Test</p> <p>With the following grades:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul> <p>The overall grading for the EPA is:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Merit</li> <li>• Distinction</li> </ul>

## Length of end-point assessment period

The EPA will be completed within an EPA period lasting typically of 6 months after the EPA gateway.

## Order of assessment methods

The assessment methods can be delivered in any order.

## Gateway

The EPA period should only start once the employer is satisfied that the apprentice is consistently working at or above the level set out in the occupational standard, that is to say they are deemed to have achieved occupational competence. In making this decision, the employer may take advice from the apprentice's training provider(s), but the decision must ultimately be made solely by the employer.

In addition to the employer's confirmation that the apprentice is working at or above the level in the occupational standard, the apprentice must have completed the following gateway requirements prior to beginning EPA:

English and mathematics at level 2

For those with an education, health and care plan or a legacy statement the apprenticeships English and mathematics minimum requirement is Entry Level 3 and British Sign Language qualification are an alternative to English qualifications for whom this is their primary language.

For Project Report with presentation and supplementary questioning:

- A project brief will be submitted to the EPAO at the gateway, thereby allowing the EPAO to provide the report title. Following the gateway, the EPAO will provide the title of the report within 2 weeks of receiving the project brief.  
The project brief must scope out the work-based project and should include a summary of the stages covered by the work-based project and an overview of the tasks as well as the specific responsibilities and duties assigned and undertaken by the apprentice.

For Professional Discussion:

- no specific requirements

For Technical Test:

- no specific requirements

# Assessment methods

## Assessment method 1: Project Report with presentation and supplementary questioning

This method has 2 components.

### Assessment method 1 component 1: Project Report

#### Overview

Apprentices must produce a project report based on a pre gateway work-based project during the EPA period, which will be the basis of a presentation to the independent assessor with supplementary questioning immediately after the presentation.

The project report is compiled after the apprentice has gone through the Gateway process.

A project brief will be submitted to the EPAO at the gateway, thereby allowing the EPAO to provide the report title. Following the gateway, the EPAO will provide the title of the report within 2 weeks of receiving the project brief.

The project brief must scope out the work-based project and should include a summary of the stages covered by the work-based project and an overview of the tasks as well as the specific responsibilities and duties assigned and undertaken by the apprentice.

The rationale for this assessment method is:

This assessment method has been selected as individuals in this occupation will be deployed on AI-based project work and using this pre-gateway project work as a basis of the project report enables apprentices to demonstrate a range of Knowledge, Skills and Behaviours in this occupation where the work cycle is too long to be observed. The project report allows for a broad set of KSBs to be evidenced. It can produce something which is of genuine business benefit to the employer; this means it is also cost effective.

#### Delivery

Apprentices will complete a project report based on a pre-Gateway AI work-based project which will be the basis of a project report and presentation with supplementary questioning immediately after the presentation.

The work-based project may address any of the following issues:

- an idea/opportunity to use AI or new developments in the AI/Machine Learning field in the business
- a specific business problem to be addressed using AI
- a recurring issue.

Typical project titles could include:

- Usage of AI to optimise processes or allocation of resources
- How AI may be used to improve customer service
- Use of AI to predict demand and changing behaviours.

The project report must be based on the pre-gateway real work-based project carried out in the employer's workplace as part of the apprentice's day to day activities.

The apprentice will have 6 weeks to complete their project report from the EPAO confirming the title of the report, and then to submit this to the EPAO. The Independent Assessor should have at least one week to review the Project to prepare for the presentation.

The employer will ensure the apprentice has sufficient time and the necessary resources within this period to prepare the project report. The employer should allow the apprentice 2 days per week to work on their project report during the EPA period. Whilst completing the project report, the apprentice should be subject to the supervision arrangements outlined below:

- Normal line management controls. The apprentice may work as part of a team which could include technical internal or external support however the report will be the apprentice's own work and will be reflective of their own role and contribution.

The project report should be in the form of a paper based or electronic report.

All work relating to the project report must be started and completed during the EPA period.

The project report will comprise of a written report with a word count of 5,000 words. A tolerance of plus or minus 10% is allowed. Appendices, references, diagrams and tables will not be included in this total.

The format of the project report should be:

- Introduction and background
- Outline of the issue or opportunity and the business problem to be solved
- Methods used & justification
- The scope of the project (including key performance indicators)
- Data selection, collection & pre-processing
- Survey of potential alternatives
- Implementation - performance metrics
- Results
- Discussion & conclusions/recommendations
- Summary of findings
- Implications
- Caveats & limitations
- Appendices
  - Code & documentation used for the project e.g. coding developed
  - Statistical rigour - To include uncertainty/bias/error estimates as appropriate
  - Figures/tables/visualisation as appropriate to project
  - Mapping of the project report to the KSB's mapped to this method
  - Verification by the apprentice's employer that the project report is a true reflection of the apprentice's involvement, and the report is their own work.

The project report will be conducted as set out here:

The apprentice will need to consider the availability of company and external resources required to complete the project report. They must also ensure they are fully aware of the KSBs the project report is intended to assess as that is what the grading of the project report will be based on.

When the project report is submitted to the EPAO, the employer and the apprentice should verify the submitted work is that of the apprentice, authenticating the apprentice's contributions to the project the report is based on.

Apprentices must submit their project report to the EPAO by the end of 6 weeks after the EPAO has agreed the project title, and at least one week before the presentation.

## Marking

This assessment method is graded holistically and therefore the independent assessor will make the grading decision based on both of the components within this assessment method.

The independent assessor will make all grading decisions.

## Assessment method 1 component 2: Presentation with supplementary questioning

### Overview

Apprentices will prepare and deliver a presentation that appropriately covers the KSBs assigned to this method of assessment.

The presentation will be based on the project report and will cover:

- a high-level summary of the main aspects of the project report
- context/implications/recommendations from the project report
- research undertaken
- practical application of knowledge, skills and behaviours to complete the project report
- business recommendations
- any follow-on outcomes
- actions and next steps.

The presentation will be completed and submitted after the gateway and following the submission of the project report, and will be presented to an independent assessor, either face-to-face or via online video conferencing. If using an online platform, EPAOs must ensure appropriate measures are in place to prevent misrepresentation.

The apprentice will have 8 weeks from the project title being agreed with the EPAO to prepare, complete and submit the presentation to the EPAO.

The rationale for this assessment method is:

The presentation is part of the overall project report with presentation and supplementary questioning assessment method.

The rationale for the use of the presentation element is that it replicates the work undertaken by competent individuals in the profession; where clearly communicating complex issues to non-technical and technical audiences is required.

The supplementary questioning allows the assessor to ask specific questions about the presentation content.

### Delivery

The presentation with supplementary questions will last for 75 minutes (the typical length of the presentation will be 30 minutes and the typical length of the questioning will be 45 minutes). The independent assessor has the discretion to increase the time of the presentation by up to 10% to allow the apprentice to answer their last question.

To deliver the presentation, the apprentice will have access to:

- flip chart
- work products
- notes
- interactive boards
- PowerPoint

- videos
- computer
- interactive demonstrations.

The presentation will be conducted as follows:

The presentation will take place on a one-to-one basis between the assessor and the apprentice. The way in which the content of the presentation is delivered is not prescriptive. The apprentice must outline details of visual aids to be used and specify any equipment required 1 week prior to the presentation. The EPAO should provide the apprentice with 2 weeks' notice of the presentation date and should allow the assessor a minimum of 1 week to review the project in advance of the presentation and prepare questions to be used at the end of the presentation.

A minimum of 10 questions will be asked at the end of the presentation; follow-up questions are allowed and do not form part of the question number count. Questions can be generated by the assessor based on the presentation, however an EPAO question bank must be provided for the assessor to use as a guide.

### Venue

EPAOs must ensure that the presentation and questioning elements are conducted in a suitable controlled environment in any of the following:

- employer's premises
- other suitable venue selected by the EPAO (for example a training provider)

The venue should be a quiet room, free from distraction and external influence.

### Supporting material

EPAOs will produce the following materials to ensure that this assessment method is marked consistently and accurately:

- outline of the assessment method's requirements
- marking materials
- question bank.

The 'question bank' must be of sufficient size to prevent predictability and the EPAO must reviewed regularly (at least once a year) to ensure that it, and its content, are fit for purpose.

The specifications, including questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs. Although independent end-point assessors will need to tailor questions according to the presentation and may also use self-generated questions.

### Marking

This assessment method is graded holistically and therefore the independent assessor will make the grading decision based on both of the components within this assessment method.

The independent assessor will make all grading decisions.

## Assessment method 2: Professional Discussion

(This assessment method has 1 component)

### Assessment method 2 component 1: Professional Discussion

#### Overview

This assessment will take the form of a professional discussion which must be appropriately structured to draw out the best of the apprentice's competence and excellence and cover the KSBs assigned to this assessment method. It will involve the questions that will focus on coverage of prior learning and activity and problem solving. The EPAO should provide the apprentice with 2 weeks' notice of the professional discussion.

The rationale for this assessment method is:

This assessment method is a valid way to draw out KSB's which would be less likely to occur in the project, presentation or technical test. It is part of this occupation to engage in detailed technical discussions and present findings and recommendations, so this assessment method mirrors the day-to-day work.

#### Delivery

The independent assessor will conduct and assess the professional discussion.

The professional discussion will last for 60 minutes. The independent assessor has the discretion to increase the time of the professional discussion by up to 10% to allow the apprentice to complete their last answer.

During this method, the independent assessor must combine questions from the EPAO's question bank and those generated by themselves.

The professional discussion will be conducted as set out here:

This is a one-to-one conversation with the independent assessor in an appropriate environment.

The independent assessor will ask a minimum of 10 open questions. Questions may be taken from the EPAO's question bank and those generated by the assessor. Follow up questions may then be used to draw out further evidence.

Video conferencing can be used to conduct the professional discussion, but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided in some way.

The independent assessor must use the assessment tools and procedures that are set by the EPAO to record the professional discussion.

The independent assessor will make all grading decisions.

#### Venue

The professional discussion should take place in a quiet room, free from distractions and influence.

The professional discussion can take place in any of the following:

- employer's premises
- other suitable venue selected by the EPAO (for example a training provider).

### Other relevant information

Independent assessors must be developed and trained by the EPAO in the conduct of professional discussion and reaching consistent judgement.

EPAOs will produce the following material to support this assessment method:

- Outline of the assessment method's requirements
- Marking materials
- A question bank.

The 'question bank' must be of sufficient size to prevent predictability and the EPAO must be reviewed regularly (at least once a year) to ensure that it, and its content, are fit for purpose.

The specifications, including questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

The independent assessor will make all grading decisions.

## Assessment method 3: Technical Test

(This assessment method has 1 component)

### Assessment method 3 component 1: Technical Test

#### Overview

The rationale for this assessment method is:

This is a cost effective and efficient way to test some of the knowledge and skills in the apprenticeship standard. It complements the other methods as it tests technical knowledge and skills that cannot be fully tested otherwise.

#### Test Format

The technical test can be:

- computer based with the test preloaded or paper based

It will consist of 4 long response questions.

These questions will consist of:

- Questions based on scenarios.

#### Test administration

Apprentices must have a maximum of 100 minutes to complete the test.

The technical test is closed book which means that the apprentice cannot refer to reference books or materials.

The following equipment is permitted during the test:

- Calculator
- Pen and notepaper.

Apprentices must take the test in a suitably controlled environment that is a quiet space, free of distractions and influence, in the presence of an invigilator. The invigilator may be the independent assessor, or another external person employed by the EPAO or specialised (proctor) software, if the

test can be taken on-line. The EPAO is required to have an invigilation policy that will set out how the test/examination is to be carried out. This will include specifying the most appropriate ratio of apprentices to invigilators to best take into account the setting and security required in administering the test/examination.

The EPAO is responsible for ensuring the security of testing they administer to ensure the test remains valid and reliable (this includes any arrangements made using online tools). The EPAO is responsible for verifying the validity of the identity of the person taking the test.

The EPAO must verify the suitability of the venue for taking the test.

## Marking

Tests must be marked by independent assessors or markers employed by the EPAO following a marking guide produced by the EPAO.

## Question and resources development

Questions must be written by EPAOs and must be relevant to the occupation and employer settings.

It is recommended that this be done in consultation with employers of this occupation. EPAOs should also maintain the security and confidentiality of their questions when consulting employers. EPAOs must develop 'question banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the questions they contain, are fit for purpose.

## Required supporting material

As a minimum EPAOs will produce the following material to support this method:

- a test specification
- sample test and mark scheme
- live test and mark scheme
- invigilation policy.

## Reasonable adjustments

The EPAO must have in place clear and fair arrangements for making reasonable adjustments for this apprenticeship standard. This should include how an apprentice qualifies for reasonable adjustment and what reasonable adjustments will be made. The adjustments must maintain the validity, reliability and integrity of the assessment methods outlined in this assessment plan.

## Weighting of assessment methods

Each of the Assessment Methods are equally weighted.

# Grading

## Assessment method 1: Project Report with presentation and supplementary questioning

KSBs	Themes	Fail	Pass In order to achieve a pass, all the pass descriptors mapped to this assessment method must be met.	Distinction In order to achieve a distinction, all the pass criteria and all the distinction criteria mapped to this method must be met.
K13 K14 K23 S3 S17	<b>Awareness of the opportunities of AI and data science to create business value and growth</b>  (K13, K14)	Does not meet the pass criteria	AI and data science solution developed within the project addresses a business need in line with quality standards and timescales. The business value of a data product / solution and any constraints making trade-offs accordingly have been considered.	Articulates a commercial awareness of organisational priorities. Explains how the practical trade-offs in implementing an AI or data science solution for the particular business context have been addressed and shape the solution accordingly to optimise outcomes.
S2 S9 S10 S22 S25 K6 S24 K28 S4 S5 S7	<b>Critically evaluate the effectiveness and performance of proposed AI and data science solutions</b>  (K23, S3, S17)	Does not meet the pass criteria	<p>Critically evaluates the performance of developed AI and machine models and the steps taken to mitigate sources of error and bias.</p> <p>Considers and selects from a range of appropriate principles, techniques and solutions to enhance the robustness of decisions at all stages.</p> <p>Critically evaluates the arguments, assumptions, abstract concepts and data to make business focussed recommendations.</p>	<p>Critically evaluates and adapts practice making recommendations for communicating technical methodology.</p> <p>Explains when they have effectively communicated technical information in a team context which has influenced others and impacted positively on decisions or working practices.</p>

<p>S27 B2</p> <p>B6</p> <p>K1 K3 K5 K26 S11 S15 S18</p>			<p>Demonstrates how, from the range of possible solutions presented, they contributed to identifying the optimal solution.</p> <p>Explains how they implement data curation and data quality controls in line with organisational and regulatory requirements.</p>	
	<p><b>Apply systematic methodology and project management principles in the delivery of innovative, stable and robust solutions</b></p> <p>(S2, S9, S10, S22, S25)</p>	<p>Does not meet the pass criteria</p>	<p>Selects and uses datasets, programming languages, tools and scientific methodologies to research business problems, providing a clear justification for their selection.</p> <p>Analyses and critically evaluates test data and proposed solutions, considering current and future business requirements.</p> <p>Manipulates and analyses complex datasets and critically evaluates arguments, assumptions, abstract concepts and data (that may be incomplete) to make recommendations and to enable a business solution or range of solutions to be achieved.</p>	
	<p><b>AI Project and Development Management</b></p> <p>(K6, S24)</p>	<p>Does not meet the pass criteria</p>	<p>Correctly selects and applies development, research methodology and project management techniques to engage with customers and solve the business problem being addressed.</p>	<p>Can evidence suitable methodology and tools have been selected with understanding of the impact of this choice on working practice, along with the risks to continuity of working practice that may arise if such solutions are not utilised.</p>

<p><b>Use of communication and influencing skills across teams</b></p> <p>(K28, S4, S5, S7, S27, B2, B6)</p>	<p>Does not meet the pass criteria</p>	<p>Describes how they have worked with a range of technical and non-technical stakeholders adapting their approach successfully to meet their diverse needs.</p> <p>Explains how to work autonomously and collaboratively with multidisciplinary teams indicating when each would be appropriate.</p> <p>Describes how they have analysed information and data, using questioning and discussions with subject matter experts to scope new AI and data science requirements.</p> <p>Written and verbal communication is clear, structured and appropriate for the audience</p> <p>Explains how to work with software engineers to ensure suitable testing and documentation processes are implemented.</p>	<p>Explains how they adapted their approach with a range of technical and non-technical stakeholders and in different situations in order to achieve the best outcome for the business.</p> <p>Evaluates solutions and explains the risks and implications of the AI data science requirements and alternative approaches and ways to address them.</p>
<p><b>Application of technical knowledge</b></p> <p>(K1, K3, K5, K26, S11, S15, S18)</p>	<p>Does not meet the pass criteria</p>	<p>Describes how they applied appropriate scientific and technological methods for machine learning, AI and data science solutions, services and platforms to deliver business outcomes outlining successes and challenges.</p>	<p>Explains the rationale for selecting particular technical solutions, including the relevant consideration of scientific benefit and suitability for working practices.</p> <p>Appraises AI and/or Data solutions and explains the risks and implications of the process, alternative approaches and ways to address them.</p>

## Assessment method 2: Professional Discussion

KSBs	Themes	Fail	Pass In order to achieve a pass, all the pass descriptors mapped to this assessment method must be met.	Distinction In order to achieve a distinction, all the pass criteria and all the distinction criteria mapped to this method must be met.
K7 K16 K18 K19 K22 K25 S1 S16 S19 S20 S26  K8 K10 S6 S8 S14 S23 S28 B1 B4 B7  K11 K17 K21	<b>Use and knowledge of, computing and statistical foundations of AI and data science</b>  (K7 K16 K18 K19 K22 K25 S1 S16 S19 S20 S26)	Does not meet the pass criteria	<p>Describes how to use statistical, AI and machine learning methodologies such as data-mining, supervised/unsupervised machine learning, natural language processing and machine vision to meet business objectives.</p> <p>Explains how to solve problems and evaluate software solutions via analysis of test data and results from research, feasibility, acceptance and usability testing in line with organisational requirements.</p> <p>Describes the relationship between mathematical principles and core techniques in AI and data science within the organisational context.</p> <p>Explains how they have used programming languages and modern machine learning libraries for commercially beneficial scientific analysis, simulation and data engineering to meet business needs. Uses applied research and data modelling to design and refine the infrastructure and architectures to deliver secure, stable and scalable data products; including enterprise, private and public cloud resources and services.</p>	Explains when they have challenged the norm through investigating and proposing a solution and the impact this had.

<p>K29 S12 B3  B5 B8</p>			<p>Explains how to design algorithms for accessing and analysing large amounts of data, including Application Programming Interfaces (API) to different databases and data sets.</p>	
	<p><b>Professional practice in a commercial environment</b></p> <p>(K8, K10, S6, S8, S14, S23, S28, B1, B4, B7)</p>	<p>Does not meet the pass criteria</p>	<p>Explains how they have developed their professional working practices and leadership techniques in regards to AI and data science and how this has improved organisational practice.</p> <p>Justifies their choice of techniques, explaining the risks and benefits and offers an alternative to technical and non-technical audiences.</p> <p>Explains how they share and disseminated AI and data science practices across organisations to improve industry practice.</p> <p>Explains how they have made independent impartial decisions respecting the opinions and views of others in complex, unpredictable and changing circumstances to benefit the business.</p> <p>Explains how they have worked with software engineers to ensure suitable testing and documentation processes are implemented in line with organisational requirements.</p>	<p>Critically analyses the wider social context and current issues and trends, applying the findings with justification and shares these with the wider community.</p>
	<p><b>Awareness of the current and future impact of AI and data science for industry and society</b></p>	<p>Does not meet the pass criteria</p>	<p>Describes how the potential roles and impact of AI and data science could affect own organisation, industry and society.</p> <p>Explains how they have assessed and addressed the potential business impact of ethical issues relating to AI and Data Science, the way procedures and methods are selected,</p>	

	(K11, K17, K21)		<p>and the unintended consequences to the business when they are applied.</p> <p>Describes how they have applied solutions, demonstrated awareness and explained the changes and trends that have led to the enhancement the working practices within their organisation and other members of the team.</p> <p>Explains the impact, consequences and risks of non-compliance to the business.</p>	
	<p><b>Development of suitable AI and data science solutions, with consideration for ethical, legal, regulatory and governance issues</b></p> <p>(K29, S12, B3)</p>	Does not meet the pass criteria	Evaluates the regulatory, ethical, and legal requirements that affect implementation of solutions including the need for accessibility for all users and diversity of user needs.	
	<p><b>Continuous Professional Development</b></p> <p>(B5, B8)</p>	Does not meet the pass criteria	<p>Analyses how they take responsibility for their own and their team's currency of knowledge and skills, their professional and personal growth and development.</p> <p>Explains how they selected and applied the most effective/appropriate AI and data science techniques to solve a complex business problem in line with organisational and regulatory requirements.</p>	

## Assessment method 3: Technical Test

In order to achieve a pass in the Technical Test the apprentice must meet all pass criteria. In order to achieve a distinction in the technical test the apprentice must meet all pass criteria plus all distinction criteria.

KSBs	Themes	Fail	The apprentice must demonstrate that they:	The apprentice will meet all of the pass descriptors and all of the distinction descriptors below:
K2, K4, K9, K12, K15, K20, K24, K27  S13, S21	<b>Deliver AI and data science solutions effectively</b>  (K2, K4, K20, K24, S21)	Does not meet pass criteria	Describes the key theoretical and technical aspects which underpin AI and data science, ensuring effective identification, delivery and implementation.	Compares different data storage, processing, and machine learning methods and concludes which is the most effective and why.
			Describes appropriate means of exposure, linking, storage, analysis and visualisation of complex datasets.	Explains the differences between uncertainty in the outputs of data collection and analysis.
	<b>Manage the delivery of AI and data science solutions, appropriate to the business problem, and with awareness</b>		Differentiates between the types of uncertainty associated with the outputs of data collection and analysis.  Outlines how choice of dataset and methodologies applied could be a source of error and bias.	Assesses the business impact of adhering to relevant ethical, legal, professional and regulatory requirements
			Describes the relevant ethical, legal, professional and regulatory constraints in the context of an AI solution and outlines how ethical issues impact on the wider social	

	<p><b>of relevant legal, ethical, professional and regulatory constraints</b></p> <p>(K9, K12)</p>		<p>context of AI, data science and related technologies.</p>	
	<p><b>Use of appropriate methodologies, architectures and engineering principles</b></p> <p>(K15, K27, S13)</p>		<p>Selects and applies appropriate methodologies and engineering principles to manage the design, development and deployment of AI and data science solutions.</p> <p>Describes the appropriate resources and architecture needed to solve a business problem within given constraints.</p>	<p>Justifies the choice of methodology, explaining the risks and benefits and offers an alternative.</p>

## Overall EPA grading

All EPA methods must be passed for the EPA to be passed overall.

Apprentices must gain at least a pass in all assessment methods to achieve a pass overall.

Apprentices must gain at least a pass in one assessment method and a distinction in two of the assessment methods to gain a merit overall

Apprentices must gain a distinction in all three assessment methods to gain a distinction overall.

Grades from individual assessment methods should be combined in the following way to determine the grade of the EPA as a whole:

Project report with Presentation and Supplementary Questioning	Professional Discussion	Technical Test	Overall grading
Fail	Fail	Fail	Fail
Fail	Fail	Pass	Fail
Pass	Fail	Fail	Fail
Pass	Fail	Pass	Fail
Fail	Pass	Pass	Fail
Pass	Pass	Fail	Fail
Fail	Pass	Fail	Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Pass
Pass	Distinction	Pass	Pass
Pass	Pass	Distinction	Pass
Distinction	Pass	Distinction	Merit
Pass	Distinction	Distinction	Merit
Distinction	Distinction	Pass	Merit
Distinction	Distinction	Distinction	Distinction

## Re-sits and re-takes

Apprentices who fail one or more assessment method will be offered the opportunity to take a re-sit or a re-take. A re-sit does not require further learning, whereas a re-take does.

Apprentices should have a supportive action plan to prepare for the re-sit or a re-take. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action.

An apprentice who fails an assessment method, and therefore the EPA in the first instance, will be required to re-sit or re-take any failed assessment methods only.

If an apprentice fails Assessment Method 1: Project report with presentation and supplementary questioning, the apprentice must produce and submit a new project report and presentation. In this circumstance, the apprentice will be given a further 6 weeks in which to write and submit a new report followed by a further 2 weeks in which to submit a new presentation.

Any assessment method re-sit or re-take must be taken during the maximum EPA period, otherwise the entire EPA must be taken again, unless in the opinion of the EPAO exceptional circumstances apply outside the control of the apprentice or their employer.

Re-sits and re-takes are not offered to apprentices wishing to move from pass to merit/distinction or merit to distinction.

Where any assessment method has to be re-sat or re-taken, the apprentice will be awarded a maximum EPA grade of pass, unless the EPAO determines there are exceptional circumstances requiring a re-sit or re-take.

## Roles and responsibilities

Role	Responsibility
Apprentice	<ul style="list-style-type: none"> <li>• participate in development opportunities to improve their knowledge skills and behaviours as outlined in the standard</li> <li>• meet all gateway requirements when advised by the employer</li> <li>• understand the purpose and importance of EPA and undertake EPA</li> </ul>
Employer	<ul style="list-style-type: none"> <li>• support the apprentice to achieve the KSBs outlined in the standard to their best ability</li> <li>• determines when the apprentice is working at or above the level outlined in the standard and is ready for EPA</li> <li>• select the EPAO</li> <li>• confirm arrangements with EPAO for the EPA (who, when, where) in a timely manner</li> <li>• ensure apprentice is well prepared for the EPA</li> <li>• should not be involved in the delivery of the EPA</li> </ul>
EPAO	<p>As a minimum EPAOs should:</p> <ul style="list-style-type: none"> <li>• understand the occupational role</li> <li>• appoint administrators/invisgulators and markers to administer/invigilate and mark the EPA</li> <li>• provide training and CPD to the independent assessors they employ to undertake the EPA</li> <li>• provide adequate information, advice and guidance documentation to enable apprentices, employers and providers to prepare for the EPA</li> <li>• deliver the end-point assessment outlined in this EPA plan in a timely manner</li> <li>• prepare and provide all required material and resources required for delivery of the EPA in-line with best practices</li> <li>• use appropriate assessment recording documentation to ensure a clear and auditable mechanism for providing assessment decision feedback to the apprentice</li> <li>• have no direct connection with the apprentice, their employer or training provider i.e. there must be no conflict of interest</li> <li>• maintain robust internal quality assurance (IQA) procedures and processes, and conducts these on a regular basis</li> <li>• conform to the requirements of the nominated external quality assurance body</li> <li>• organise standardisation events and activities in accordance with this plan's IQA section</li> <li>• organise and conduct moderation of independent assessors' marking in accordance with this plan</li> </ul>

	<ul style="list-style-type: none"> <li>• have, and operate, an appeals process</li> <li>• arrange for certification with the relevant training provider</li> </ul>
Independent assessor	<p>As a minimum an independent assessor should:</p> <ul style="list-style-type: none"> <li>• understand the standard and assessment plan</li> <li>• deliver the end-point assessment in-line with the EPA plan</li> <li>• comply to the IQA requirements of the EPAO</li> <li>• be independent of the apprentice, their employer and training provider(s) i.e. there must be no conflict of interest</li> <li>• satisfy the criteria outlined in this EPA plan</li> <li>• hold or be working towards an independent assessor qualification e.g. A1 and have had training from their EPAO in terms of good assessment practice, operating the assessment tools and grading</li> <li>• have the capability to assess the apprentice at this level</li> <li>• attend the required number of EPAOs standardisation and training events per year (as defined in the IQA section)</li> </ul>
Training provider	<p>As a minimum the training provider should:</p> <ul style="list-style-type: none"> <li>• work with the employer to ensure that the apprentice is given the opportunities to develop the KSBs outlined in the standard and monitor their progress during the on-programme period</li> <li>• advise the employer, upon request, on the apprentice's readiness for EPA prior to the gateway</li> <li>• Plays no part in the EPA itself</li> </ul>

## Internal Quality Assurance (IQA)

Internal quality assurance refers to the requirements that EPA organisations must have in place to ensure consistent (reliable) and accurate (valid) assessment decisions. EPA organisations for this EPA must:

- appoint independent assessors who have knowledge of the following occupational areas: Have recent relevant experience of the occupational specialisms: AI applications Data Science Machine learning. Hold a qualification at level 7 or above in a technical discipline aligned to the subject of this apprenticeship standard
- appoint independent assessors who have recent relevant experience of the occupation/sector at least the same level as the apprentice gained in the last two years or significant experience of the occupation/sector
- appoint independent assessors who are competent to deliver the end-point assessment
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- have robust quality assurance systems and procedures that support fair, reliable and consistent assessment across the organisation and over time
- operate induction training and standardisation events for independent assessors when they begin working for the EPAO on this standard and before they deliver an updated assessment method for the first time
- ensure independent assessors attend standardisation events on an ongoing basis and at least once per year

## Affordability

Affordability of the EPA will be aided by using at least some of the following practice:

- online assessment
- using an employer's premises
- assessing multiple apprentices simultaneously

## Professional body recognition

Professional body recognition is not relevant to this occupational apprenticeship.

# Mapping of knowledge, skills and behaviours (KSBs)

## Assessment method 1: Project Report with presentation and supplementary questioning

Knowledge
<b>K1</b> How to use AI and machine learning methodologies such as data-mining, supervised/unsupervised machine learning, natural language processing, machine vision to meet business objectives
<b>K3</b> How to apply advanced statistical and mathematical methods to commercial projects
<b>K5</b> How to design and deploy effective techniques of data analysis and research to meet the needs of the business and customers
<b>K6</b> How data products can be delivered to engage the customer, organise information or solve a business problem using a range of methodologies, including iterative and incremental development and project management approaches
<b>K13</b> How to identify the compromises and trade-offs which must be made when translating theory into practice in the workplace
<b>K14</b> The business value of a data product that can deliver the solution in line with business needs, quality standards and timescales
<b>K23</b> The use of different performance and accuracy metrics for model validation in AI projects
<b>K26</b> The scientific method and its application in research and business contexts, including experiment design and hypothesis testing
<b>K28</b> How to communicate concepts and present in a manner appropriate to diverse audiences, adapting communication techniques accordingly

Skills
<b>S2</b> Independently analyse test data, interpret results and evaluate the suitability of proposed solutions, considering current and future business requirements
<b>S3</b> Critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make recommendations and to enable a business solution or range of solutions to be achieved
<b>S4</b> Communicate concepts and present in a manner appropriate to diverse audiences, adapting communication techniques accordingly
<b>S5</b> Manage expectations and present user research insight, proposed solutions and/or test findings to clients and stakeholders.
<b>S7</b> Work autonomously and interact effectively within wide, multidisciplinary teams
<b>S9</b> Manipulate, analyse and visualise complex datasets
<b>S10</b> Select datasets and methodologies most appropriate to the business problem

<b>S11</b> Apply aspects of advanced maths and statistics relevant to AI and data science that deliver business outcomes
<b>S15</b> Identify, develop, build and maintain the services and platforms that deliver AI and data science
<b>S17</b> Consistently implement data curation and data quality controls
<b>S18</b> Develop tools that visualise data systems and structures for monitoring and performance
<b>S22</b> Apply scientific methods in a systematic process through experimental design, exploratory data analysis and hypothesis testing to facilitate business decision making
<b>S24</b> Apply research methodology and project management techniques appropriate to the organisation and products
<b>S25</b> Select and use programming languages and tools, and follow appropriate software development practices
<b>S27</b> Analyse information, frame questions and conduct discussions with subject matter experts and assess existing data to scope new AI and data science requirements

<b>Behaviours</b>
<b>B2</b> Reliable, objective and capable of independent and team working
<b>B6</b> Is comfortable and confident interacting with people from technical and non-technical backgrounds. Presents data and conclusions in a truthful and appropriate manner

## Assessment method 2: Professional Discussion

<b>Knowledge</b>
<b>K7</b> How to solve problems and evaluate software solutions via analysis of test data and results from research, feasibility, acceptance and usability testing
<b>K8</b> How to interpret organisational policies, standards and guidelines in relation to AI and data
<b>K10</b> How own role fits with, and supports, organisational strategy and objectives
<b>K11</b> The roles and impact of AI, data science and data engineering in industry and society
<b>K16</b> Understand high-performance computer architectures and how to make effective use of these
<b>K17</b> How to identify current industry trends across AI and data science and how to apply these
<b>K18</b> The programming languages and techniques applicable to data engineering
<b>K19</b> The principles and properties behind statistical and machine learning methods
<b>K21</b> How AI and data science techniques support and enhance the work of other members of the analytical team.
<b>K22</b> The relationship between mathematical principles and core techniques in AI and data science within the organisational context

<b>K25</b> Programming languages and modern machine learning libraries for commercially beneficial scientific analysis and simulation
<b>K29</b> The need for accessibility for all users and diversity of user needs

Skills
<b>S1</b> Use applied research and data modelling to design and refine the database & storage architectures to deliver secure, stable and scalable data products to the business
<b>S6</b> Provide direction and technical guidance for the business with regard to AI and data science opportunities
<b>S8</b> Coordinate, negotiate with and manage expectations of, diverse stakeholders, suppliers with conflicting priorities, interests and timescales
<b>S12</b> Consider the associated regulatory, legal, ethical and governance issues when evaluating choices at each stage of the data process
<b>S14</b> Work collaboratively with software engineers to ensure suitable testing and documentation processes are implemented
<b>S16</b> Define requirements for, and supervise implementation of, and use of data management infrastructure; including enterprise, private and public cloud resources and services
<b>S19</b> Use scalable infrastructures, high performance networks, infrastructure and services management and operation to generate effective business solutions.
<b>S20</b> Design efficient algorithms for accessing and analysing large amounts of data, including Application Programming Interfaces (API) to different databases and data sets
<b>S23</b> Disseminate AI and data science practices across departments and in industry, promoting professional development and use of best practice
<b>S26</b> Select and apply the most effective/appropriate AI and data science techniques to solve complex business problems
<b>S28</b> Undertakes independent, impartial decision-making respecting the opinions and views of others in complex, unpredictable and changing circumstances
Behaviours
<b>B1</b> A strong work ethic and commitment in order to meet the standards required
<b>B3</b> Acts with integrity with respect to ethical, legal and regulatory ensuring the protection of personal data, safety and security
<b>B4</b> Initiative and personal responsibility to overcome challenges and take ownership for solutions
<b>B5</b> Commitment to continuous professional development; maintaining their knowledge and skills in relation to AI developments that influence their work
<b>B7</b> Participates and shares best practice in their organisation, and the wider community around all aspects of AI data science
<b>B8</b> Maintains awareness of trends and innovations in the subject area, utilising a range of academic literature, online sources, community interaction, conference attendance and other methods

## Assessment method 3: Technical Test

Knowledge
<b>K2</b> How to apply modern data storage solutions, processing technologies and machine learning methods to maximise the impact to the organisation by drawing conclusions from applied research
<b>K4</b> How to extract data from systems and link data from multiple systems to meet business objectives
<b>K9</b> The current or future legal, ethical, professional and regulatory frameworks which affect the development, launch and ongoing delivery and iteration of data products and services
<b>K12</b> The wider social context of AI, data science and related technologies, to assess business impact of current ethical issues such as workplace automation and misuse of data
<b>K15</b> The engineering principles used (general and software) to investigate and manage the design, development and deployment of new data products within the business
<b>K20</b> How to collect, store, analyse and visualise data
<b>K24</b> Sources of error and bias, including how they may be affected by choice of dataset and methodologies applied
<b>K27:</b> The engineering principles used (general and software) to create new instruments and applications for data collection

Skills
<b>S13</b> Identify appropriate resources and architectures for solving a computational problem within the workplace
<b>S21</b> Identify and quantify different kinds of uncertainty in the outputs of data collection, experiments and analyses